**Newton’s Toy Box- Notes**

**Activity #1: Intro to Motion**

A **force** is a push or pull. Examples of a force are gravity, magnetism, friction, etc.

**Velocity** is speed in a particular direction. Altering the moving object’s speed and/or direction can change velocity.

An ***unbalanced external force*** changed the direction of the path of the sphere in activity #1. It was *unbalanced* because it was applied to only one side of the sphere. It was external because the force was applied to the *surface* of the sphere. This type of force is also called a **net force.**

**Newton’s first law of motion** states that an object will remain at rest or in uniform motion unless acted on by an unbalanced external force.

An object’s tendency to remain at rest or in motion is **inertia**. Newton’s firstlaw of motion is also called the **inertia principle.**

**Activity #2: Gravity and Balance**

**Gravity** is the force pulling objects toward the center of the Earth. The gravity force is pulling *down* on all objects on Earth’s surface. If an object is not falling there must be a **gravity support force** supporting the object against the downward pull of the gravity force. This is the force that **balances** gravity.

To measure **gravity force** we measure the **gravity support force** required to keep the object from falling. Since the two forces are balanced to keep the object from falling, the measure of the **gravity support force** is equal to the gravity force.

**Weight** measure of gravity pulling an down on an object.

Units of force are called **newtons (n).**

**Mass** is the amount of matter that an object contains.

**Activity #3: Moving Masses**

**Gravity Force** pulls more stronglyon objects that have **more mass**.

**Acceleration** is the rate of change in the speed and direction of an object. Acceleration can mean speeding up, slowing down or changing direction,

Acceleration can be affected by both **force** and **mass.** Objects with a greater mass will move slower than objects with a lesser mass and subject to the same amount of force. The stronger the force on an object, the greater the acceleration.

The steel ball and the wooden sphere hit the floor at the same time because the gravity force on the steel ball was increased by its greater mass, while the force created by book was greater on the wooden sphere because of its smaller mass.

**Newton’s Second Law of Motion** states: an object acted on by a net force will accelerate in the direction of the force. The object’s acceleration equals the net force divided by the mass of the object